

Experiment No.: 07

Name of the Experiment: DC-DC Boost Converter Using PI Controller

Objectives:

- Learn to Generate a Changing Pulse Algorithm which will Try to Make the Output Voltage Equal to Reference Voltage
- Use PI Controller to Design the Boost Converter Circuit

Software Package:

- MATLAB
- Simulink

DC-DC Boost Converter:

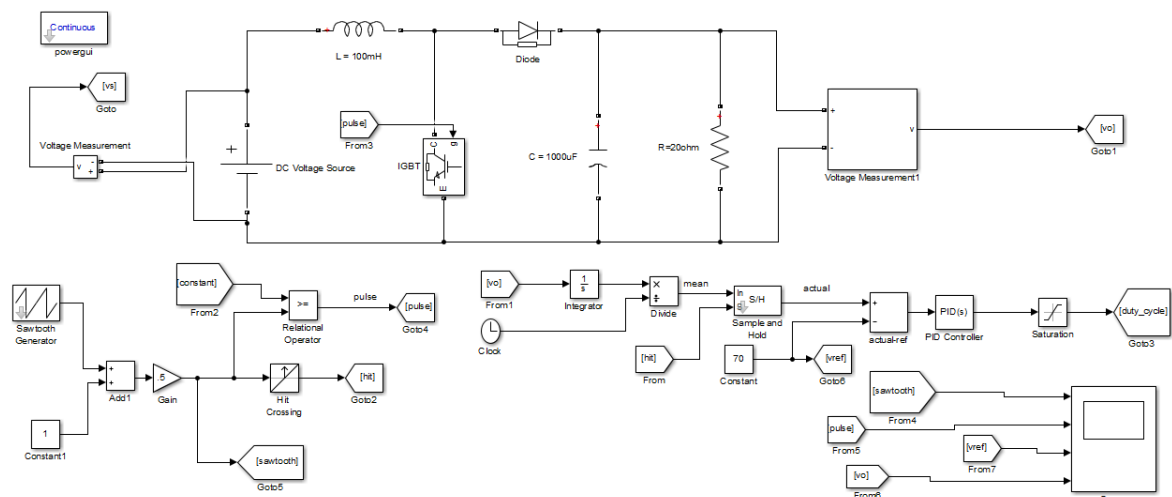


Figure 7.1.: DC-DC Boost Converter Circuit Diagram using PI Controller (where Vref = 70V)

Output:

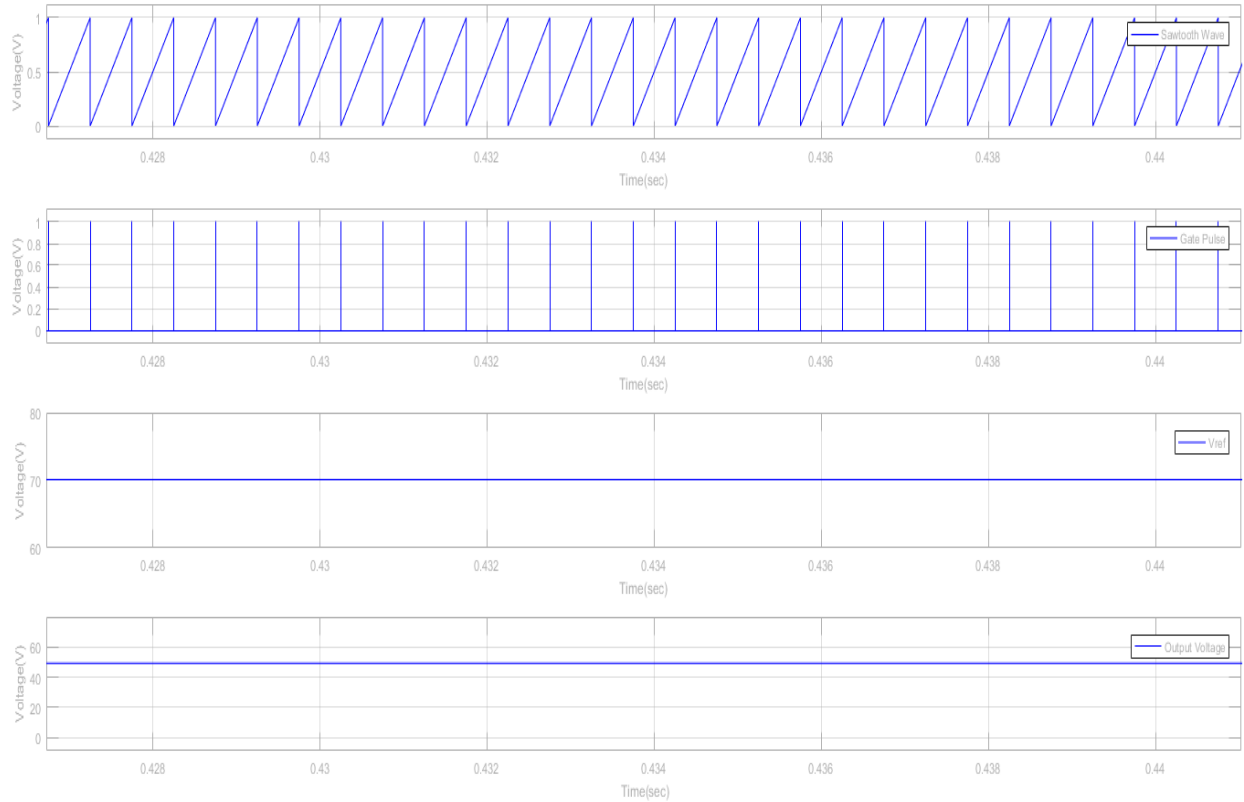


Figure 7.2.: Sawtooth Waveform, Gate Pulse, Reference Voltage and Output Waveform of the Circuit where Input 50V

Result and Discussion: In this experiment dc-dc boost converter was designed using PI controller. According to the value of duty cycle the output changes. Here the duty cycle range was set between 0.05 to 0.95. According to the difference of output and the reference voltage which is set in the circuit, the duty cycle is supposed to be set. If the difference is negative then the output is lower than the ref voltage so the duty cycle must be increased. Otherwise, the duty cycle must be decreased. So, to do so a PI controller is designed where $k = 20$ and $p = 25$. So according to the pulse voltage the output will be yielded. The circuit is designed very carefully but the output doesn't yield the desired value in this experiment since through PI controller the duty cycle is always 0.05 as a result the output is between 51v to 52v.